GrummanWorld

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NASA Pact Signed

On August 7, Grumman President John O'Brien and Assistant NASA Administrator Stu Evans signed the contract naming Grumman as Space Station Program Support Contractor for NASA.

Grumman will help manage the design and development of the space station. The new division will be responsible for ensuring once the space station hardware goes into orbit that all the components come together and work properly.

Present at the signing were (L to R): Dick Kline, vice president, Grumman Space Station Program Support Division; Division President Fred Haise; Herb Baker, NASA procurement contracting officer; O'Brien; Pat Curran, Division business manager; Alex Harrisiadis, Division business operations manager; and Evans.

Grumman Inks Lease For Houston Site

HOUSTON, Texas — On August 24, Grumman and the City of Houston signed a long-term lease on property at Ellington Field that will become the new home of Grumman's civil space programs.

Houston Mayor Kathryn J. Whitmire and Jacob J. Bussolini, Grumman vice president-Business Operations, signed an agreement for a 66-acre tract at Ellington Field. The 40-year lease has options for an additional 79 acres and to extend the time period another 40 years.

In October 1986, Grumman announced that its Space Systems Division would transfer the civil space unit from Long Island, New York, to Houston. Proximity to Houston's NASA Johnson Space Center was cited as a major factor in the company's decision. Civil space programs — renamed Houston Operations, is developing portions of NASA's space station and other space-related advanced technology systems.

This fall, NASA is slated to pick four prime contractors to design and develop the space station and Grumman is vying for a significant role in the project. Grumman is a member of two different industry teams: for work package one, managed by NASA Marshall Space Flight Center, Huntsville, Alabama, Grumman is teamed with Boeing; for work package two, managed by NASA Johnson Space Center, Grumman is a subcontractor to Rockwell International.

Grumman's Houston Operations at Ellington Field will mark the first space-related manufacturing facility in the Houston area. Employment is estimated at 1,000 by 1989; some 900 people could be hired locally along with about 100 transfers from New York.

The complex will feature three major buildings totalling more than one-half million square feet of floor space: an office building of 130,000 square feet; a 120,000-square-foot simulation and robotics laboratory; and a 250,000-plus square-foot assembly and test building. The complex will represent an investment greater than $50 million. Site planning is nearing completion and preliminary building design is underway.

Grumman To Develop ADI Radar Technology

Grumman has received a $2.9 million contract from the U.S. Air Force to develop a radar technology for the Air Defense Initiative (ADI). Work will be performed for the Air Force's Rome Air Development Center at Griffis Air Force Base in N.Y.

While the Strategic Defense Initiative (SDI) deals with ways to defend against incoming ground- and sea-launched ballistic missiles, ADI is geared toward detecting strategic bombers and air- and sea-launched cruise missiles. These air-breathing cruise missiles fly in the lower atmosphere and hug the curvature of the Earth.

An airborne early warning system will likely be a part of ADI's surveillance, tracking and weapon systems network. Under the recently awarded contract, Grumman is developing technology for an advanced radar system called the Atmospheric Surveillance Technology/Airborne Radar for the airborne early warning (AEW) aircraft. The actual platform for the radar system will not be determined for several years.

Grumman engineers in Aircraft Systems began working on the Phase I contract for the ADI radar technology on May 1. During the 18-month development phase, the Air Force is expected to exercise two options for additional work, worth about $1.5 million.

Westinghouse and Hughes received similar contracts from the Air Force to develop ADI radar technologies. In 1989 the Air Force will hold a full and open competition for further development of the Atmospheric Surveillance Technology/Airborne Radar. ■

Innovation Could Help Pilots Cope With Lightning

The Federal Aviation Administration (FAA) is flight testing a Grumman innovation that could keep pilots from being temporarily blinded by lightning.

Grumman's experiment is carried aboard the FAA's Convair 580 flying laboratory, which is operating from Patrick Air Force Base on Florida's east coast, where thunderstorms occur almost daily in midsummer. The experiment will determine how well a Grumman-developed and patented photochromic (the word means a substance that changes color when exposed to radiant energy such as light) system reacts to lightning flashes. The photochromic materials darken when exposed to the brief, brilliant flash, much like photo-sensitive sunglasses do in sunlight. The materials used are manufactured under proprietary agreements with American Optical Company and Corning Glass Works.

The prototype for the Grumman system was developed initially for military use. It was intended to protect aircraft and helicopter canopies and windows from both the physical and the visual effects of high-power laser weapons. Now, if it proves feasible, it will mean safer flying for everyone.

"If lighting strikes near an airplane cockpit, the whole cockpit goes white," says Dr. Herb Kivlighn, a scientist for Grumman's Corporate Research Center who has been studying flashblindness countermeasures since 1976. "This can cause a temporary blindness that can last for about 30 seconds depending on the intensity of the flash."

Scientists know that lightning has plenty of ultraviolet and blue light and it is to these components

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Wisconsin Governor Cuts Ribbon At New Boat Plant

MINONG, Wisconsin, August 10 — Governor Tommy Thompson cut the ribbon at the dedication of Grumman Boats' new plant here in the northwestern corner of the state.

The event drew much media coverage because of the effect that even a small operation such as this has in an area of high unemployment. When Grumman Allied announced it would open this plant, about 1,200 people applied for the 50 job openings.

Thirty-nine people are already at work at four of the five assembly lines. They are making canoes, fishing and pontoon boats from parts produced at the Marathon, New York, plant. The fifth line should be running early next month. Grumman Boats, which is a unit of the Allied Division, also produces boats in Marathon and Arkadelphia, Arkansas.

The Minong plant was opened because it is in the heart of the largest market in the country for Grumman Boats' product line.

Grumman Boats President Bob Steinway hosted a dealer meeting here several weeks ago. "We picked up about 30 new dealers," he says.

Moreover, recent orders they received will keep Minong busy. "We had estimated that about 175 pontoon boats would be built from startup until the end of this year. We have orders in hand for over 200 already," says Steinway. Orders for the other boat models are also near or above expectations.■

As Sally Field Said, 'You Really Like Us'

Last month, *Grumman World* conducted a readership survey. We wanted to find out if Grummanites read the paper, if they liked it, and if they had suggestions for improving it.

The staff contacted 301 Grummanites by telephone. The participants — from all divisions and locations — were selected randomly from the telephone directory.

The survey participants had an average age of 38 years and had an average of 17.5 years in the company. 200 men were polled (average age was 44); 101 women were polled (average age was 33). Of the 301 people interviewed, 198 work on Long Island (144 in Bethpage); 103 work at other Grumman locations.

Here are the results:

Grumman World is published twice a month. Do you think this is often enough?

Yes	276 people (92%)
No, too often	4 (1%)
No, not often enough	21 (7 %)

Do you read every issue?

Always (or most of them)	236 (78%)
Sometimes	56 (19%)
Never	9 (3%)

How much of the paper do you usually read?

Everything or most of it	198 (66%)
Half of it	60 (20%)
Just glance at it	34 (11%)
Never read it	9 (3%)

Do you read the Chairman's Letter?

Yes	232 (77%)
No	23 (8%)
Sometimes	46 (15%)

Do you like Grumman World?

Yes	297 (99%)
No	4 (1%)

Note: Since nine people don't read it at all this doesn't make a great deal of sense. We attribute this and other disparities to the possibility that people were just being nice to the staff.

Here is a sample of the types of articles that people said they would like to see:

More stories about off-Long Island sites (81)
Projections about Grumman's future (40)
Stories about Grumman people (36)
Contract updates (22)
Technical updates (11)

Beginning with the August 14th issue, Grumman World is conducting a readership survey in every issue. We welcome your suggestions and comments. This issue's survey is page 11. Don't be shy; we'd like to know what you think.

He'll Be Remembered. *Capt. Dave Williams (R) shows Bonnie Sewell the plaque that will stand outside the Whidbey Island Flight Simulator Center. The Center was dedicated to her husband, Chuck Sewell, Grumman's chief test pilot who died in a plane crash last summer. Aircraft Systems President Renso Caporali (C) spoke at the ceremonies. (Photo courtesy* Whidbey News-Times*)*

Navy Honors Sewell

The Navy dedicated its Flight Simulator Center at the Whidbey Island Naval Air Station, Washington, to Grumman chief test pilot Chuck Sewell, who was killed in a plane crash one year ago. His wife, Bonnie Sewell, and Aircraft Systems President Renso Caporali attended the July 31 ceremonies at Whidbey.

"His many contributions to the A-6 and EA-6B communities and to all of Navy and Marine aviation are invaluable, and like the man himself, are legendary," said Capt. David Williams, the commander of NAS Whidbey Island.

"He was known as the world's foremost expert in spin testing," said Caporali. "He is the only experimental test pilot to have more than once won the Kincheloe Award from the Society of Experimental Test Pilots as test pilot of the year."

A plaque was presented by RAdm. Fred Metz, the commander of Medium Attack Tactical Electronic Warfare, U.S. Pacific Fleet. There was also a flyover by Navy and Marine aircraft.

Personnel Sponsors Two Fairs

Next month, Grumman Personnel will sponsor two fairs for all Grummanites. The annual Health Fair will be held September 28 and 29; the new Dependent Care Fair will take place September 30-October 1. Grummanites can stop by the exhibits from 11:30 a.m. to 4 p.m. each day on the concourse of the headquarters building in Bethpage.

At the Health Fair, representatives of many health organizations will be available to outline the services and programs they offer. Among those who will have booths will be the Suffolk County Respite Care Association, the Sickle Cell Project, American Diabetes Association, and the Multiple Sclerosis Society. In addition, free blood pressure checks will be given.

The Dependent Care Fair will have the American Association of Retired Persons, the Nassau County Department of Senior Citizen Affairs, the Foster Grandparents Association, the Suffolk County Day Care Council and many other organizations on hand.■

GDS Institute Holds Seminars

Grumman Data Systems is offering IBM personal computer software and CADD (computer-aided design and drafting) seminars throughout 1987.

Grummanites can receive a special discount on tuition for these seminars. For more information, call the Institute's Admission Department, 364-2055 in Nassau; 467-6690 in Suffolk.

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Norine Lyons
Director - Corporate Publications
575-3720

Kathleen Housley
Editor — 575-3293

Associate Editors
Bob Sample — *575-5118*
Sue Vassallo — *575-8999*
John Vosilla — *575-5119*

Bernadette Gately
Editorial Assistant — 575-4334

On Tour. *At Grumman's Salisbury facility (L-R), Bertha Hickmond and Bruno Caputo, vice president, Great River/Salisbury Operations, talk about Grumman's work with Sen. Barbara Mikulski (D-Md.). (Photo by Bob Sagliocca)*

Salisbury Crew Meets Its Newest U.S. Senator

SALISBURY, Maryland — U.S. Senator Barbara Mikulski (D-Md.) toured the Electronics Systems Division facility here on August 19.

The senator's visit was part of a month-long tour of defense employers throughout the state. Previously a veteran congresswoman from Baltimore, Mikulski was elected to the Senate last fall and is a member of the Senate appropriations committee.

During her tour, Sen. Mikulski asked several dozen Grummanites about their work. The 336 Grummanites at the two-year-old facility mainly build wire harnesses for Grumman aircraft. About 90 percent of them were hired locally and completed a training program co-sponsored by Grumman and the State of Maryland. The division expects employment there to top 400 by the year's end.

Sen. Mikulski capped her visit with an address to the entire Salisbury work force, gathered in a vacant corner of the facility. Grumman acquired the building from a now-defunct clothing manufacturer.

"Many of you worked here five years ago, and remember feeling that the company and you were going no place," said Sen. Mikulski. "In my opinion the best social program is a job. I'm very impressed with what Grumman has done here."

At the close of her visit, Sen. Mikulski was presented with a framed print of an F-14 Tomcat autographed by all the Grummanites at Salisbury. It will hang in the senator's new Salisbury office.■

The 25-Year Luncheon Will Be Held At The Crest Hollow Country Club In Woodbury, Long Island On December 8, 1987

Rolls-Royce Increases Data Systems Workload

Rolls-Royce of England has expanded the first phase of Grumman Data Systems' contract to design and build a test system for jet engines.

Grumman is now doing the preliminary design of Rolls-Royce's automated data reduction system, third generation (ADR-3). This is the first of a three-phase contract that will span eight years and total over $40 million. Originally, the phase one contract called for nine months of work at a price of $1.4 million. That has increased to two years and about $3 million.

"Since we began the project last fall, the requirements have increased dramatically," says Charlie Schiano, program director. "Rolls-Royce wants to conduct more tests and more complex tests. It also wants more communications capabilities."

Rolls-Royce is one of the top makers of aircraft engines and expects the ADR-3 system to speed up the introduction of new ones. In testing, instrumentation is connected to an engine and measurements recorded, analyzed and displayed by computers. The ADR-3 system will provide results instantly, or in "real-time." It will link all the test groups at Rolls-Royce's military engine center, in Bristol, and its commercial center, 100 miles away in Derby.

Rolls-Royce also wants the Grummanites to review its computer aided engineering and manufacturing processes, because ADR-3 hardware and software must be developed to link all these systems. That may create additional business opportunities.

There are 13 people working on the project: 10 Grummanites and three people from System Designers Ltd., Grumman's British teammate. They have alternated between Holtsville, Long Island; Bristol; and Derby.

Early next year, Grumman will issue its request-for-proposals to industry. Grumman will attempt to "buy British," but many of the potential suppliers are branches of U.S. firms.

During phase two, which will begin in 1989, about 50 people will be hired. Most will work for Grumman, the rest for System Designers. Grumman's Paumanock Development subsidiary has tentatively found quarters in a town near Bristol.

Schiano recently visited China and Japan to discuss Grumman's test-system expertise. While in China he delivered a technical paper on computer aided testing for the IEEE/Chinese Computer Federation.

It was in Japan, however, that Schiano saw the most interest in Grumman's capabilities. "Subaru approached us to see if we can apply real-time testing to the development of cars and car parts," says Schiano.

Schiano has follow-up meetings this fall with Fuji Heavy Industries (which owns Subaru), Mitsubishi, and IHI, Japan's no. 1 aircraft engine company. Elsewhere, Pratt and Whitney of Canada has made overtures to Grumman Data Systems for this type of test system.■

Getting It Just Right. *Edward Tlustachowski of the Tube Fabrication and Hydraulic Department in the Aircraft Systems Division measures length, rotation and bend degrees of a hydraulic line mock-up with a tool called the Vector I. The information is digitally recorded and then sent to the bending machines which use the measurements to accurately bend the production hydraulic lines. (Photo by Rich Breunig)*

O'Brien Addresses VFW Convention:

'The Space Station Program Appears To Lack A Spirit Of National Purpose'

On August 19, Grumman President John O'Brien was a guest speaker at the 88th national convention of the Veterans of Foreign Wars (VFW) of the United States. The convention was held August 14-21 at the New Orleans Hilton and was attended by about 14,000 delegates. O'Brien's topic was the U.S. Space Station; his remarks preceded greetings by Sen. Bob Dole (R-Kans.). The text of O'Brien's speech follows.

As American Veterans of Foreign Wars, you have experienced an environment where dedication and sacrifice are united; where a commitment to ideals and principles is measured by a willingness and readiness to act decisively; where a group's unity of purpose within a platoon or among allied nations is the critical difference between success and failure, between life and death.

You are people who understand well the importance of group commitment to a common cause. You know the value of uniting the nation behind a clear objective. You respect the role that national pride and prestige have played in our past, and must play in our future.

One of the great sources of our national pride has been the space program. President Reagan has said that the challenge of space requires "the same bold vision, courage and indomitable spirit that made us a great nation." This morning I want to share with you my views about why we need that vision, courage and spirit; why they are critical to the success of the space program and the nation's future.

Eighteen years ago this summer, mankind set foot on the moon for the first time. The United States was then the acknowledged leader in space exploration, dominant in the related technologies.

Less than two decades later, we are in danger of losing our position of leadership in space science and exploration. Indeed some have argued that we already have lost that status to the Soviet Union, which now commands an impressive array of space related capabilities.

MIR, the Soviet space station, is at this very moment performing successfully and has been for sixth months. The Soviet shuttle will launch late this year, or early next, before the United States is able to resume its own shuttle program.

Last year the Soviet Union accounted for 91 of the total 103 Earth orbiting missions launched throughout the world. It was the Soviets' lowest number in six years. They commit approximately three times the number of personnel to their space program as the United States and average two rocket launches per week.

However, the Soviet Union is not the only other nation active in space. West Germany, China, France, India, Italy, Japan, Sweden and the United Kingdom all have significant space technologies. More than two dozen countries now possess spacecraft. Six have launch capability. Altogether, more than 125 nations are involved in space related activities.

Whether we are in fact barely ahead or slightly behind all these competitors in the race to outer space, there is no doubt that we have lost the preeminence in manned space flight we earned. Some attribute this decline to loss of focus, to being diverted by international and domestic crisis: terrorism, the search for alternative energy sources, domestic economic uncertainties.

In the search for solutions to these problems, space lost its primacy on the American agenda, despite the fact that the American people support a renewed, more focused, government commitment to the space program. Nine out of 10 people favor continuing shuttle launches even if there is some risk, as there always will be. Eight out of 10 support the development of a space station. Six out of 10 support spending whatever it costs for the U.S. to maintain space leadership.

The message is clear: the space station is important to the people and they are willing to pay for it.

But despite enthusiastic and widespread public support for an aggressive space program, it seems to lack a coherent constituency. It has most everyone's support, but claims no teams of ardent lobbyists, no arena for public debate, no priorities of political purpose, no focus of values and direction.

Most of all, the space station program appears to lack a spirit of national purpose. We had it during the Apollo moon missions. We need to develop it again.

I doubt we would have ever made it to the moon had not President Kennedy declared the mission a national imperative and lent his personal charisma to the charge.

While the nation's commitment to space has become a secondary national priority, the promise that space holds for us continues to increase. Space today represents more than just a new arena of military and scientific competition. The international prestige and recognition accorded nations for their accomplishments in space engender a more cooperative atmosphere for other diplomatic initiatives. The commercial opportunities in research and manufacturing are boundless.

'One of the great sources of our national pride has been the space program'

Perhaps most importantly, in a world of diminishing natural resources and expanding populations, space is an environment where humanity may have to learn to live and adapt.

But these political, military, even humanitarian possibilities do not encompass all the reasons for exploring the universe's vast unknowns. One reason that is too often forgotten or ignored is the continuous, ongoing human commitment to what I call the process of discovery.

Finding out new and different things that we do not expect, or cannot predict, is the essence of discovery. It may sound strange coming from a businessman, but you cannot always justify costs by predictable benefits or returns — the unanticipated is sometimes the most valuable return on investment.

For us the most monumental unanticipated discovery occurred not quite 500 years ago, when Columbus reached the shores of the American continent. Incidentally, that 500th year anniversary will coincide with the last scheduled year of the Space Station's design and development phase.

Compared to investment in Columbus' voyage, the cost of 15 billion dollars may seem high. Granted, that is a lot of money. But estimated over a 10 year period, it will amount to less than 1/10,000 of the gross national product or about two cents per day per person.

By comparison, we have spent more than a decade digging a water viaduct underneath Manhattan at a cost in excess of one billion dollars. That public works project, however necessary, only serves one borough of New York City.

The Space Station would serve mankind.

Any act of discovery requires a vehicle — a platform — that positions you to realize great potential, that gets you from here to there. Columbus needed ships. Armies use beachheads to launch campaigns. Societies require conventions, like this one, to rally people around common principles.

I believe NASA's permanently manned orbiting space station is the next logical platform in mankind's evolving process of discovery.

There has been a long running debate about the value of manned versus unmanned space flight. I don't intend to reconstruct that technical debate right now. We at Grumman have worked with NASA on both manned and unmanned systems. In fact, automation and robotics play a strong role in the current Space Station concept.

'Space is an environment where humanity may have to learn to live and adapt'

But in the case of the Space Station, the compelling reason for constructing it for human beings is that it is our platform for continuing to learn and discover what we do not already know.

There are other reasons the system should be manned. We are, because of our extraordinary vision and manual dexterity, in many ways the most versatile executors of physical labor. We have the capacity to think, to recognize and interpret information, to respond at the moment, on the job.

In many previous space flights, the human ability to gather, organize and integrate information from different sources has converted technical failure into mission success. That will surely continue in the future.

The Space Station itself will represent an incredible achievement in our society's ability to apply its many institutional and technological resources. To make the entire program work, from design and development through assembly, integration and operation will require unprecedented coordination among the many participating organizations: including government, academia and business.

This ambitious procedure is the ultimate exercise in planned systems integration. We at Grumman Corporation are proud to be the contractor responsible for this challenging assignment which over the course of 10 years will involve six NASA centers; seven prime contractors and a large number of subcontractors; more than ten-thousand personnel; and the cooperation of Canada, Western Europe and Japan.

Obviously any enterprise of such dimension cannot afford significant failure. For those of us who are directly involved, that is the ultimate challenge. Reliability and safety are the critical criteria of civil manned space flight.

Like the Apollo series, and unlike the development of more conventional aircraft, there will be no opportunity for real life testing. In fact, the first operational use of the Space Station will be the first real test of feasibility, reliability and safety.

The funding to pay for this next challenge will become a measure of our willingness, and our collective ability, to pursue space exploration as a national objective. The objective has nothing to do with making money or using the Space Station as an experimental laboratory, although we may do both.

Our goal must be to use the Space Station as a platform of discovery. I ask all of you, as dedicated Americans and leaders in your communities, to lend your support to this platform and help us rediscover our sense of national purpose.■

When Lightning Strikes, Trouble Can Be In Eye Of Beholder

(Continued from page 1)
that Grumman's photochromic material reacts. To test them, an experiment was designed to stand alone within a compact, rugged container mounted securely inside the Convair 580.

Inside one end of the box is a two-inch square piece of the photochromic material and a laser detection system to monitor the light transmission. The material is exposed to light coming through one of the plane's windows. When lightning strikes, the material's light transmission and darkening behavior are measured.

The FAA's Convair 580 is usually flown by a crew of four: two pilots and two technical people. The plane is equipped to test avionics and airframe systems against the worst electrical hazards nature can stir up. To do that, the crew flies into the heart of thunderstorms.

"It's a hell of a ride," says Mike Glynn, the FAA's project manager. "When we fly through thunderstorms, everyone and everything has to be strapped down. It's very rough."

During a mission the crew endures about 15 minutes of pounding and shaking from turbulence. Then they fly to a clear area, change the data recording tapes and fly back into the storm. They may go through this 10 times in a day — if the crew can take that much.

Until this year, missions were flown through thunderheads. The FAA now wants data on cloud-to-ground lightning, so the crews now fly under the clouds.

Flight testing of the Grumman process is crucial because Kivlighn cannot duplicate lightning's time and energy characteristics in the laboratory. One bolt has about 10 kilowatts of energy and is one millisecond in duration.

The experiments will run through mid-August. A possible next step would be to flight test a canopy or partial canopy made from the material. Those tests could happen as early as 1989. ■

A Flying Lightning Rod. *Mike Glynn, FAA project manager of the lightning program at Patricks Air Force Base, says the FAA Convair has gotten 52 direct hits — eight this summer — from lightning.*

'Let The Rider Beware'

PATRICK AIR FORCE BASE, Florida — When Mike Glynn wakes up each morning, he checks the weather forecast. A forecast of late afternoon thunderstorms makes his day.

Glynn is the project manager for the Federal Aviation Administration's lightning studies here. He is in charge of half a dozen people whose job is to fly through thunderheads and try to get struck by lightning.

"For the past decade or so, we've been studying lightning and its effects on aircraft," says Glynn. "The biggest problems we perceive are in the areas of composites and fly-by-wire flight control systems."

Glynn says that an all-metal airframe acts as a good conductor during thunderstorms. However, there is concern about composites. "Plastic airplanes will take away some of the protection," he says. "We've had composite parts on our airplane melt during a direct strike."

The advent of fly-by-wire flight control systems is also a potential trouble spot. "Simply put: instead of having flight controls being a series of hardware hookups, a micro-electrical signal is sent to the fuel controller on the engine through a wire. It's basically saying 'Keep the fuel coming, keep the fueling coming...' But what happens if lightning strikes and the micro-electrical signal is botched up and says 'turn the fuel off, turn the fuel off.' You'd be in for a helluva ride."

Such high-tech systems are more vulnerable to the effects of lightning, so the FAA is studying ways to protect those systems. In the end, the FAA hopes to tell aircraft manufacturers how to protect planes from lightning."

This section of Florida is an ideal spawning ground for thunderstorms. "Even though it is clear out this morning, we can predict that some good thunderheads will crop up later today," says Glynn. Overnight, the land cools off. During the day, the sun heats up the ground and convection currents start. Combine these with the sea breezes and some mighty big thunderheads take shape by late afternoon. The thunderstorms run from Daytona to Orlando to Tampa.

This summer, the FAA plane is flying at altitudes around 10,000 feet. The chances of getting struck by lightning are less than at higher altitudes, but the FAA wants to find out more about cloud to ground lightning this summer.

Inside the plane, there are numerous recording devices to measure an assortment of scientific data such as electromagnetic pulses. Five regular VCRs are hooked up to cameras on the wings and aircraft belly and in the cockpit. There are old airline seats in the back of the cabin for observers, but there are few takers.

A crew of four usually flies in the FAA's Convair 580: two pilots and two technical people. The plane is rated experimental. "In other words: let the rider beware," says Glynn. "All the crewmembers volunteer. Basically, you'll find these people motivated by the scientific aspect of furthering science." For instance, crewmember Jean Reazer has been studying lightning for 10 years. The past three summers she has been flying with Glynn's group.

Except for some areas of the plane that are painted bright orange, most of the fuselage is bare aluminum. Little dinks — similar to an unfinished drilling job — are scattered about the fuselage especially aft of the wings. Glynn has plotted the lightning's path by circling all the little dinks. "Lightning will hold onto paint more and it acts like a blowtorch. It just holds on. With aluminum it will skip along real fast and make little dinks. But if it gets on a painted surface it wants to hang on a little longer and makes a little puddle of molten metal," says Glynn.

On the side of the plane, 52 lightning bolts are stenciled; these represent the number of direct hits the aircraft has received during its thunderhead missions. This year, there have been eight direct hits.

"By and large, it is not a fun flight," says Glynn, who has been on several flights over the years. "Throwing up is routine." Dramamine and motion-sickness patches are the norm for flight crews.

During the flights, the cockpit offers the most stable place to ride. "The cabin appears to be rotating around the cockpit," says Glynn. 'You get tunnel vision back here. You're moving and the cockpit is not."

Shake, Rattle And Roll

Joe Havranek described the ride in the FAA's flying laboratory as "a little worse than a roller coaster." The Grumman research technician who works in Corporate Research in Bethpage enjoyed his six rough-and-tumble days of flying through thunderstorms.

Havranek, 59, volunteered to operate a Grumman experiment aboard the FAA's Convair which flies out of Patrick Air Force Base in Florida.

During his flights, they lost cabin pressure, lost sensor covers to hailstones and had the radio antenna knocked out of commission by a lightning strike.

"Have you ever been on a plane and hit turbulence?" Havranek asked. With all the emotion of a man describing his

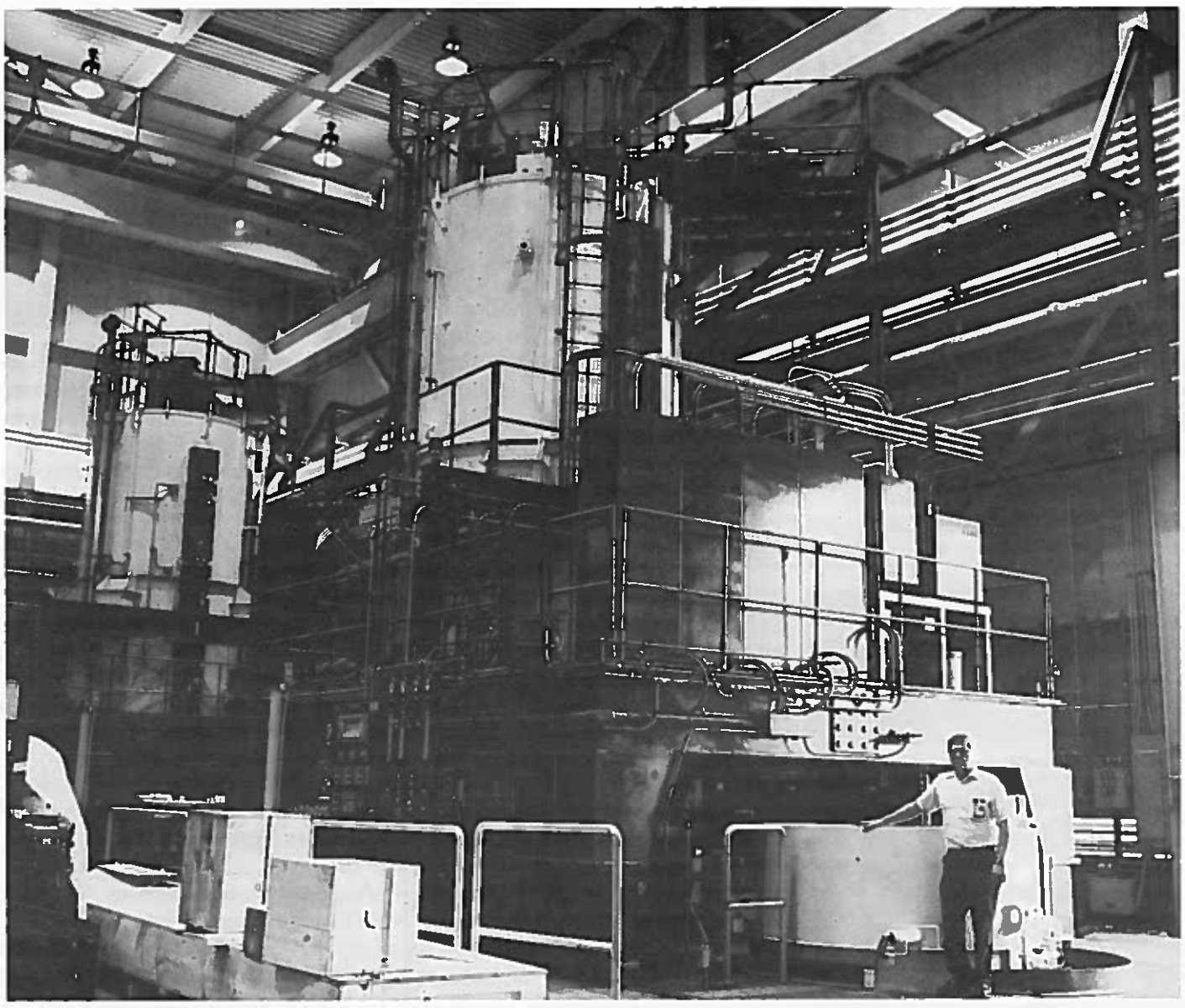
Joe Havranek

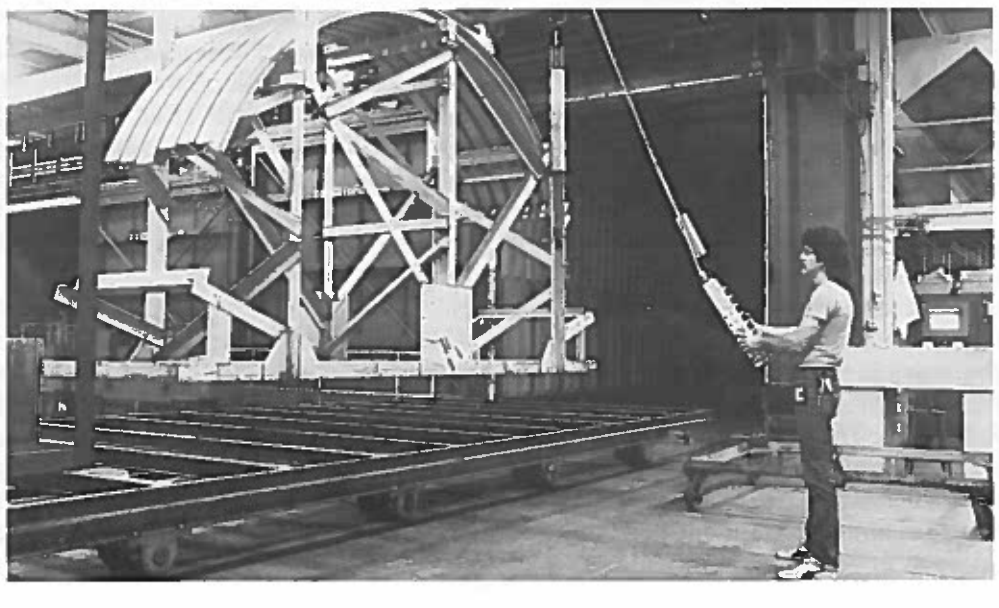
typical, daily commute home he said, "This was a lot worse. One time we dropped about 1,000 feet; that was about the worst incident."

He joined Grumman in 1960 as a Flight Avionics technician at Calverton.

His wife, Bertha, who works for Electronics Systems in Great River, wasn't too happy about his recent return to the skies. "I don't think she wanted to lose me," he said. "But this was for science. Besides I like flying and I like lightning."

After his first flight on the Convair, the FAA crew gave him a patch that they each wear. "He joined a unique society of lunatics," said Paul McDermott of Marketing. "There are probably less than 20 people in the U.S. who have ever done this."





New Look. *(Clockwise, from top) Leadperson Teddy Steffens works with the new steel gantry hardening furnaces. Operator Mike Ward prepares aluminum sheets for the furnace while Dave Vetrano places upper frame parts for the Boeing program on a dolly. Jay Wells moves aluminum parts to the liquid nitrogen furnaces.*

Tired Of Ta

The coals of a blacksmith's furnace help him work iron into shape. But modern Grumman blacksmiths now have efficient electric furnaces to give strength and toughness to aerospace metals.

The modernization of Grumman's Heat Treat department is part of a $90 million, five-year Grumman and Navy program that affects all of Aircraft Systems manufacturing. Most of the Heat Treat department has been moved out of Building 2 into the new extension in front of Building 3 in Bethpage.

The operation is new from the ground up. There are new furnaces and quench tanks. Computers control and monitor the processes. The change means production efficiency and better working conditions for the people in the department.

Three shifts a day, seven days a week, ovens are fired up. "We process 350 to 500 work orders a day here. Some work orders can have 600 parts on them. There are very few metal parts made in Grumman that we don't touch," says Ellie Reavis, foreman of Heat Treat.

You've seen the heat treatment process if you've watched a blacksmith work iron into horseshoes. After he hammers the heated metal into shape he dowses the shoe in water. The sudden cooling makes it hard and unbending.

While the aircraft parts have been hammered and shaped elsewhere, Heat Treat's job is to give the parts the stiffness and hardness that the design calls for. The parts could be as little as a few inches long or as big as the F-14 titanium wing box.

The Heat Treat team does this by heating parts to temperatures of 900° Fahrenheit or higher for a half-hour or more. This lets the metal crystals grow to the proper size. It also removes localized problems, such as changes in a part's strength and hardness along the seam of an electron beam weld.

The parts are then taken from the furnace and cooled. They are cooled slowly if they must be flexible, or, if the parts must be hard and inflexible, they are cooled quickly by quenching them in tanks of oil or water.

There's nothing new to the process.

But times are changing for the 31 members of Heat Treat. For instance, back in their old area in Building 2, fog was a problem. When parts pulled from a 900° oven were dropped into a tank of liquid nitrogen — a cool -320° Fahrenheit — a cloud of nitrogen vapor was released. It was not hazardous because 78 percent of the air we breath is nitrogen. In Building 3 there is no fog. Huge exhaust fans eliminate the vapor.

About 10 members of Heat

...zing The Heat, They Built a New Kitchen

Treat are still wearing hooded, silver fire suits and heat-proof gloves as they pull parts from the old steel furnaces in Building 2. "You look like a spaceman in those heavy jackets," says Reavis. "You have to use tongs to pull the part out of the oven and there's still fire coming off the part."

In the new area, fire-proof jackets have been replaced by T-shirts, usually the "Anytime Baby" variety. The new-technology ovens in Building 3 keep the operators well away from the heat.

Most of new equipment planned for Heat Treat is in place, though many furnaces are still being tested. There are 24 furnaces in all. The two steel furnaces are in the budget for 1988. There are also new oil quenchers, degreasers, and there will be a walk-in sand blaster and a pre-treatment spray booth.

Even with all the furnaces, the area looks relatively empty and open under the 50-foot ceilings. This openness camouflages the hectic pace of a workday in Heat Treat. The process starts in the staging area.

"A lead person separates the work by gauge (thickness) and alloy," says Reavis.

There are thousands of parts waiting for heat treatment: long, thin ones; short, flat ones; extrusions; stampings. That gives Reavis a headache. Even with all the parts coming in, there are rarely enough of the same gauge and thickness to use an oven's total capacity.

"You cut costs by filling the oven. Shop loading — the delivery of enough similar parts to fill an oven — is the key to keeping the cost of our products down. When we're loading a furnace I have everybody out looking for more parts," says Reavis.

That's a temporary problem, however. As the entire detail parts operation becomes more centrally controlled, better scheduling will get the most from the ovens.

For now, Reavis can't wait for enough parts to fill an oven. "Most departments can't work unless we work. We have to give parts back as soon as we get them," he says. While some in his crew are out hunting parts, others are preparing what's on hand.

Parts have tags with bar codes, like cans of soup at a supermarket. The bar codes are scanned with Cost Tracking System wands to let the computers know they are in the department and being processed, who's doing the work and when the job was started.

Once sorted, the parts are tied by wire to the sides of racks or hung from wires strung across the racks like wash on a line. It looks like a simple enough job, but skill and experience are very important to this step.

"At certain temperatures, the part is like butter. If it's wired wrong, the shape changes," Reavis explains. Even if it doesn't change shape in the oven, it might under the sudden stress of the 1,200° temperature change when dropped into the liquid nitrogen tank.

"The people who wire parts have to be careful how they wire them. It takes a while, but it saves a lot of time later," Reavis says. Once distorted, parts have to be hammered back into shape.

The amount of rework has been cut at least in half with the new systems.

Heat Treat operator Charlie Jones agrees with that. "We get a better part, probably because the temperatures weren't even in the old ovens. With the new ovens, the temperature is better controlled. There is less stress between the molecules of the metal."

Once racked, the parts are moved to the ovens.

Some ovens are raised more than a story off the ground. The racks are positioned under them, then lifted through a door into the oven. With the door on the bottom, little heat is lost because warm air naturally rises.

Some ovens are too big to be raised off the floor. You could park your car inside one of them. Into these ovens go wing skins and large airframe pieces. The parts are put on dollies and rolled through the ovens' big doors.

In another section of the department is a 30-foot deep pit, covered by a grating. In the pit are several quenching tanks. Above them on the main floor are two ovens that move along the floor on rails.

These ovens move over a "bullet" — a circular system for holding parts. The bullet is lifted up into the oven.

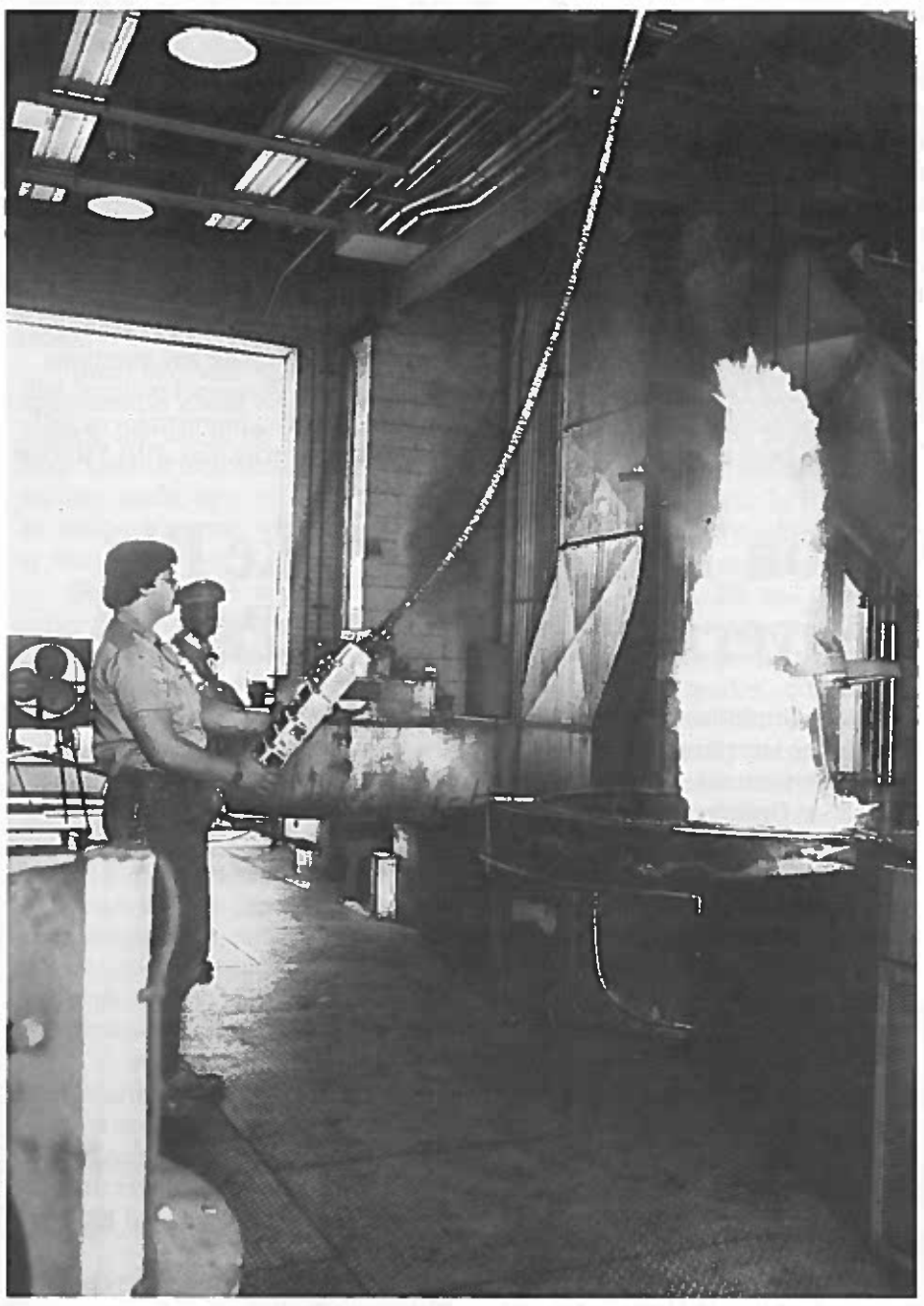
When the parts have been heated enough, the computer signals the oven to move over a quenching tank and lower the bullet into the liquid.

From the time the parts are moved to the ovens, the computers pretty much run the show. The temperature of the ovens, the time the parts are left in the oven, the manner in which they are to be cooled is information that is contained in the Building 3 computers. The computers monitor the ovens and watch the clocks. "The basic manual operation now is the wiring of the parts to the racks. After that it goes on its own," says Reavis. "We used to have to watch the charts, watch the time. All that information is in the computer. But we still check."

Sometimes, parts must go through several steps in the heat treatment or shaping process. Between steps, their physical properties have to be put in a kind of suspended animation until it's convenient to go on to the next step. Such parts are put into freezers where they'll "keep" for several days.

Computerization has taken the sweat out of the heat treat process, both the physical and the mental kinds. "The guy in charge of a job had to worry a lot before," says Reavis. "He still has to know the process, but he has to worry less now."■

Not Just Hanging Around. *It's the job of Paul Tebo and others to make sure these small aluminum parts are put onto racks without any significant forces on them. Otherwise, they could bend when heated. (Photos by Bob Sagliocca)*



Real Hot Tub. *In Building 2, operators Mike Lisa (L) and Leroy Madison quench steel parts in an oil bath, which sparks this impressive flame. Soon they'll be leaving to operate the steel gantry furnaces in Building 3.*

Where Security Is Concerned, The Buck Stops With You

While the Defense Investigative Service was still not satisfied with Grumman's performance under the Industrial Security Program, the company received improved marks for security-consciousness in the July inspection by the Defense Investigative Service.

The inspection was a follow-up to the agency's May visit, in which it found confidential documents left unsecured. This time, the agency found that Grummanites have tightened up their handling of classified documents — with some exceptions. Open for particular criticism was one section that had a number of violations.

The company will keep its satisfactory rating from the Department of Defense. It could have been barred from new contracts if it had failed the follow-up,

"Nearly everyone wanted to make an extra effort to pass the second inspection," says Harry Volz, Grumman's director of Security.

Security personnel made many spot checks between the May inspection and the agency's follow-up. "We found that Grummanites in general exhibited a greater awareness of the correct way to handle classified documents, but many people were still negligent in their responsibilities," says Volz.

"Each month, we usually burn 14 or 15 tons of classified documents, which are deposited in burn barrels," says Volz. "In July we burned 32 tons."

The Department of Defense is acutely sensitive to breaches in security by contractors. Lockheed and General Dynamics were once suspended from getting new classified work. Boeing and others have been cited for violations. Foreign companies have been selling sensitive U.S. material to the Soviet Union.

Because of the nationwide plethora of security violations, the Department of Defense is taking, in Volz's view, extraordinary steps. There have been changes to the industrial security regulations in the past 10 months and Volz expects more to come. Among those changes, the DoD is requiring contractors to put specific procedures in place to deal with employees who violate security rules, as Grumman has.

Historically, Grumman has been an industry leader in developing strong, workable security programs, says Volz. "The DoD has given us more security awards than any company of the same size in the United States," he says. "It has encouraged us to share our systems with industry. The department is now telling us that some of our employees' attitudes are poor."

To help minimize the number of future infractions, Grumman will continue the self-inspections it stepped up after the May DIS inspection. Grumman also has instituted two new policies in order to comply with the new DoD security regulations.

A Personnel policy change took effect July 21. Security compliance is now a part of performance evaluations. All Grummanites will be rated on how well they follow security guidelines.

The second new policy is a three-step disciplinary procedure. When there is a security violation, generally there will be a verbal warning first, then a written one. If infractions continue, the person can be suspended and, possibly, fired.

"But depending on the seriousness of the infraction, someone could be discharged at any time," Volz states. A number of disciplinary actions have already been taken. In addition to verbal warnings and written reprimands, there have been suspensions without pay for as long as 30 days, and one discharge.

Volz says that Security is not a watchdog. "We are here to help people comply with the security procedures," says Volz. If you have any questions about the new Personnel policies, talk to your security administrator or call Corporate Security, Ext. (111) 53635.■

The Winning Combination. *Ben Gordon of Plant Protection is responsible for changing all the lock combinations in Bethpage. DoD regulations require that combinations be changed every six months, keeping Gordon busy. (Photo by Marie Trimborn.)*

Olson Trucks To Make Big Deliveries To United Parcel

This year, Grumman Olson will produce the largest number of United Parcel Service trucks in its history, and UPS is Grumman Olson's biggest customer.

"We'll be building over 2,000 vehicles for UPS in 1987," reports Sam Rozzi, president of the Grumman Olson unit of the Allied Division. "The order represents over $20 million in business this year."

In 1986, Grumman Olson registered record sales of $117 million and record production of 12,532 trucks, and Rozzi says 1987 will be another strong year.

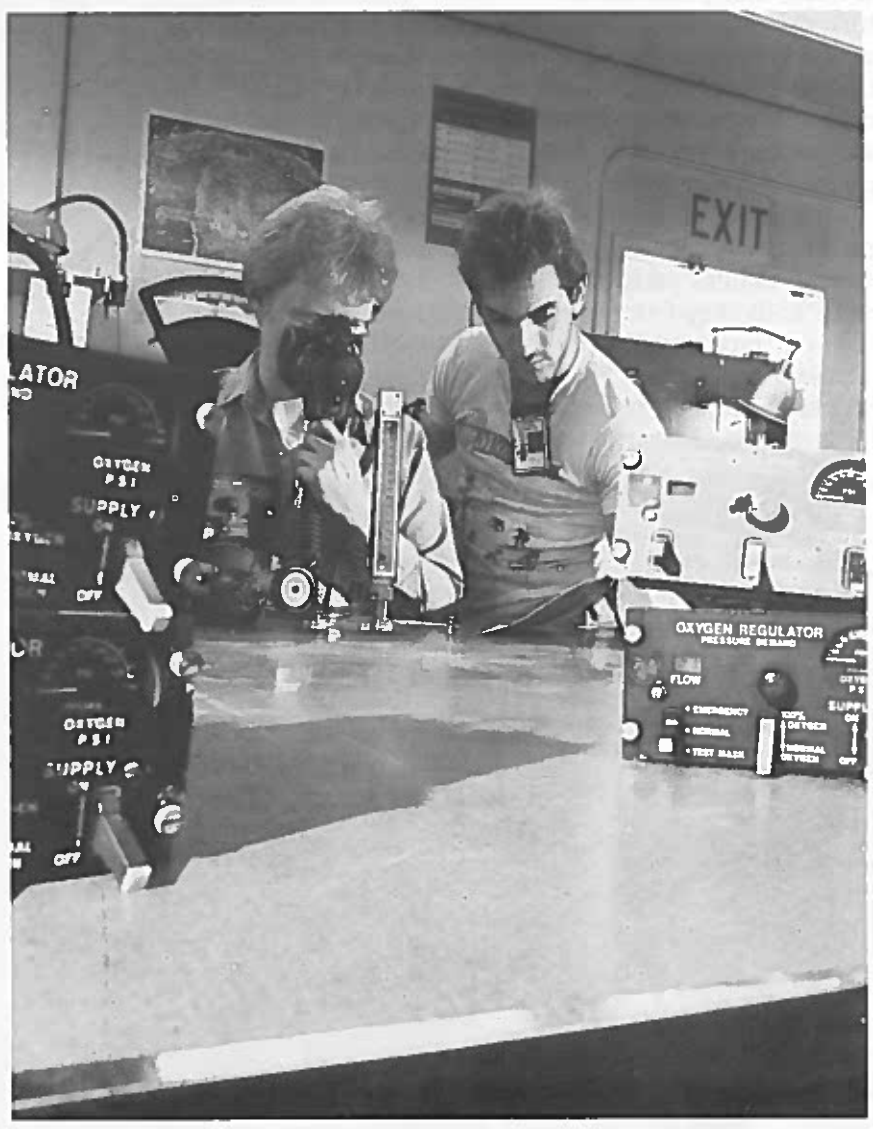
Since the late 1940s, Grumman Olson has been building the familiar brown delivery vehicles for UPS. Olson is building 13 UPS trucks a day at its main plant in Sturgis, Michigan, and another five a day in Tulare, California. That represents nearly half the total production at each site.

Olson builds three different models of Kurbmaster trucks to UPS specifications. The only real difference between the three is the number of "cubes" — the industry jargon for the amount of cargo space.

However, compared to Kurbmasters sold to other companies, there are a number of differences.

Most Kurbmasters have aluminum roofs. The UPS trucks have translucent fiberglass roofs to let in light for the drivers. They also have fiberglass hoods and stronger than normal shelves that can hold 100 pounds each.

All are built on GM chassis. The Tulare production run is being converted to diesel power to meet California emissions specifications.■



Coming Up For Air. *Oxygen technicians John Fitzgerald (L) and Joseph Sacca of the Environmental Systems Test Department in the Aircraft Systems Division test a portable oxygen supply system for the C-2A aircraft. This system will enable the on-board mechanics and air crew to walk around the aircraft with their oxygen during cabin pressure tests. These tests check the hard-mounted oxygen system which, like commercial aircraft, releases masks and automatically becomes activated should the craft's cabin pressure drop.*

Mister, Can You Spare A Pint?

People associate heroism with acts such as saving drowning babies and rescuing the victims of a mugger. But not all acts of heroism are ones that make the headlines. Some are as simple as donating a pint of blood.

Summer is an especially crucial time for blood donations. People go on vacations and forget to donate. College blood drives, usually a plentiful source of blood, are cancelled in the summer because students are away for recess. And churches and synagogues curtail their activities for the summer months. All these factors contribute to the blood shortage.

"Unfortunately," says Mary Lou Caminiti, director of this year's blood drive, "hospital patients don't take vacations."

Grummanites differ on their feelings about donating blood, but they all realize how important their contributions are.

"I'd rather go to the dentist," says Seth Freedman, who donated at corporate headquarters recently. "But I feel that this is something I have to do."

Grummanite John Jabour, who donates four times a year, agrees. "I hate donating. But if my wife or kids ever needed blood, I'd want it to be there for them."

"It gives me a good feeling to contribute. If I ever needed it, I would want other people to donate for me, so I'm donating for them," says Elaine Green.

Not everyone came with such altruistic motives. "My boss talked me into it," Stephanie Van Eycken says with a laugh. "But I'm glad I did it. It makes me feel good to do something nice for other people."

Donors aren't taking the risk some people think they are. You cannot get AIDS by donating blood. An individual, sterile needle and harness are used when you donate, then thrown away.

Discomfort is minimal, and it doesn't take that long. If you weigh over 110 lbs. and are between the ages of 17 and 76, then you are eligible to donate. (Note: The age limit was raised from 66 to 76.)

Across the country, hundreds of Grummanites donate blood every year. Sandra Sirls, the head nurse in Houston, Texas, runs two to three successful blood drives there a year. "We usually collect about 200 pints of blood from the 500 Grumman employees," she says.

"Approximately 30 percent of our employees give at the two blood drives we have," says Kay Traxler, the nurse who runs the drives at Milledgeville, Georgia. "We have one fellow who's donated over seven gallons, and quite a few more multiple gallon givers."■

A Good Cause. *Grummanite John Jabour donates blood during a recent drive at Headquarters in Bethpage. (Photo by Bob Settles.)*

Tutors Needed to Teach Illiterate Adults

Tom is an excellent chef at an Italian restaurant. However, he has a problem taking orders from his customers because he cannot read the menu.

After going through some very hard times in his life, John became a Born-Again Christian. For him, life would be perfect if he could just read the Bible.

Mary has lived a sheltered life. Her family has been there for her whenever she has needed them. At the age of 74, she's decided to learn to read.

Literacy Volunteers of America has helped these and thousands of other people each year. Some need to learn to read in order to support themselves and their families. Others want to learn for their own self-satisfaction. In the past four years, over 60 Grummanites have become volunteer tutors.

Grumman tutor Chauncey Smith, an engineer in the Building 14 Development Center, has been tutoring the same pupil for almost two years. A foreman in a machine shop, the 40-year-old student is working towards improving his third-grade reading level. Although he has been able to get by without reading, Smith says, his student feels much better about himself now that he is learning.

Grumman holds workshops and pays for the materials, and Literacy Volunteers provides the instructors to train Grummanites in communication and teaching skills. "We learned to be sensitive to the student, and to understand the awkwardness they feel as illiterate adults," says Grumman volunteer tutor Jessica Breul, a productivity analyst in Headquarters.

Workshop instructors and their assistants conduct role-playing exercises to train the tutors to handle real-life situations. For example, the assistants will pretend they cannot understand something, challenging the tutors to explain it. "We have to break the barrier," says Breul. "We learn how to get through to them."

Jean Pracher, a senior procurement control analyst in Building 30, says the training she received as a literacy volunteer helps her when she has to teach co-workers a new skill. "We learned a different approach to teaching adults," says Pracher. "Their life experience has given them basic knowledge from which to grow. And it is important for us as tutors to learn to use that knowledge as a reference for our teaching."

After the volunteers complete the six-week training workshop, they are tested on their teaching techniques. If they pass the test, they are assigned a pupil. LVA tries to match tutors with students who live in their area so that meeting is more convenient. When and how often the sessions take place is left up to the students and tutors.

"Usually if it's a good match the volunteer and student create a good relationship and set up goals for themselves, the sessions will continue for one to two years," says Anne DuPrey, executive director of the Literary Volunteers of America, Nassau County Chapter. "This is usually the case with the Grumman tutors."

Breul says she was a little apprehensive about what kind of student she would be assigned—and what kind of expectations the student would have of her. "I'm just an ordinary person who knows how to read," she says.

Sometimes the students will make appointments with the tutor and then break them because they are embarrassed or afraid. "It can be very frustrating. You want to help them, you know they need the help, but it's so hard for them to admit it," says Breul.

Breul tutored for about a year before her student became ill. "I call her now and then to see how she's doing," she says. "As soon as she's better, I hope we can continue."

DuPrey says the most important quality that the Volunteers have is their dedication. "It's not so much how many volunteers we get each year, it's the devotion of the ones we do get that's important," she says.

An orientation meeting for those interested in becoming a volunteer tutor will be held on September 10 in the auditorium of corporate headquarters in Bethpage, from 5-6:30 p.m. Volunteers must attend the tutoring workshops on September 17, 22, 29, and October 1, 6, and 13 in headquarters. The three-hour workshops start at 5 p.m. For further information, contact Monique Monaco, Ext. (111) 51426.

Grumman family members who are interested in volunteering should call Ann DuPrey of the Literacy Volunteers of America in Nassau County at (516) 486-2789. Outside Nassau County, check the white pages under Literacy Volunteers.■

Literacy Volunteers

I would like to be a literacy volunteer. Please send me an application.

Name.....

Mail Stop.....Extension.....

Mail to Monique Monaco, A33-GHQ

L. E. Baldissard

R. E. Bauer

G. M. Becker

A. R. Bodamer

C. R. Campbell

D. Capobianco

E. T. Ceraso

B. A. Dehnert

A. F. DiMarco

A. S. Doyle

J. J. Duffy

P. P. Engasser

H. G. Faulhaber

R. A. Fox

J. J. Franciscovich

V. M. Frazzitta

M. P. Healy

L. Helner

E. Hirsch

S. Hirsch

M. J. Hosek

W. A. Knight

B. Kram

H. L. Kreymborg

A. Lim

H. K. Lohmann

Service Milestones

40

Fred J. Berlenbach, Bethpage, Aircraft Systems
Donald W. Bone, Bethpage, Aircraft Systems
Anthony S. Durka, Bethpage, Aircraft Systems
John Razzini, Bethpage, Corporate Services
August C. Sarrantonio, Melville, Aircraft Systems

35

Marie Crescenti, Bethpage, Aircraft Systems
Chester E. Downing, Bethpage, Corporate Services
Bradford Ellison, Bethpage, Aircraft Systems
Bruno J. Germano, Melville, Aircraft Systems
John A. Glaser, Bethpage, Aircraft Systems
John A. Greene, Bethpage, Aircraft Systems
Hurlow W. Henle, Bethpage, Aircraft Systems
Albert G. Kaval, Bethpage, Aircraft Systems
Richard E. Kopp, Bethpage, Aircraft Systems
Frank Laurito, Stuart, Aircraft Systems
Thomas E. Lawrence, Honolulu, Corporate Services
Matthew Macchio, Bethpage, Aircraft Systems
Alfred N. Martin Jr., Bethpage, Aircraft Systems
Robert Murphy, Bethpage, Aircraft Systems
William R. Mytko, Calverton, Aircraft Systems
Wolfgang J. Nauke, Bethpage, Corporate Services
Frank Posillico Jr., Calverton, Aircraft Systems
Victor Rongo, Great River, Electronics Systems
Peter Taffner, Stuart, Aircraft Systems
Paul P. Thiergardt, Virginia Beach, Aerostructures
Donald M. Valentine, Bethpage, Aircraft Systems
Daniel A. Vignati, Great River, Electronics Systems
Charles O. Warren, Bethpage, Aircraft Systems

30

William C. Adams, Great River, Electronics Systems
Paul J. Bach, Bethpage, Aircraft Systems
William R. Brown, Melville, Aerostructures
Calvin J. Colonel, Great River, Electronics Systems
Manning H. Dandridge, Bethpage, Aircraft Systems
Herbert O. Dettmering, Bethpage, Aircraft Systems
Francis E. Hurley III, Bethpage, Aircraft Systems
August K. Kubart, St. Augustine, St. Augustine Division
Henry Meyer, Bethpage, Aircraft Systems
Richard A. Oman, Bethpage, Aircraft Systems
Peter R. Portanova, Bethpage, Corporate Services
Raymond W. Single, Stuart, Aircraft Systems
Franklyn D. Smith, Bethpage, Aircraft Systems
Ralph Warren, Calverton, Aircraft Systems

25

Harold C. Allen, Melville, Aircraft Systems
Lillian E. Baldissard, Calverton, Aircraft Systems
Ralph E. Bauer Jr., Melville, Aircraft Systems
Galen M. Becker, Bethpage, Aircraft Systems
Nero Bell, Bethpage, Corporate Services
Albert R. Bodamer, Bethpage, Aircraft Systems
William D. Brown, Melville, Aerostructures
Phillip E. Burkhardt, Bethpage, Aircraft Systems
Charles R. Campbell, Bethpage, Corporate Services
Domenico Capobianco, Calverton, Aircraft Systems
Eugene T. Ceraso, Melville, Aircraft Systems
Joseph J. Conlan, Bethpage, Aircraft Systems
Barrie A. Dehnert, Bethpage, Aircraft Systems
Andrew F. DiMarco, Bethpage, Aircraft Systems
Arthur S. Doyle Jr., Calverton, Aircraft Systems
John J. Duffy, Melville, Aircraft Systems
James Y. Eng, Bethpage, Aircraft Systems
Paul P. Engasser, Great River, Electronics Systems

Many Receive New Assignments In Aircraft Systems

The following Grummanites recently received new assignments in the Aircraft Systems Division:

Technical Operations—Steven Kane, group leader, Systems Safety, F-14A/D Program; George Stuppiello, group leader, Reliability, Maintainability and Safety-Development Center; Charles Shattuck, group leader, Reliability and Maintainability, F-14D Program; Rocco Ambruso, engineering specialist, Plume Fluid Mechanics; Raymond Ball, engineering specialist, Inlet Systems; Michael Fusco, project leader, Systems Design Development, F-14 Program; Robert Biagiotti, ILS program manager, S-2(T) SLEP; Paul Doelger, group leader, System Control Software, F-14 ADL Support Software; Nathan Nalven, engineering specialist, Computer Applications, Master Dimensions; Christopher Kennavane, group leader, Surveillance/Defensive Measures Systems, F-14 Program; Alvin Perlmutter, project engineer, Avionics Design, F/EF-111 A/E Program; David Penrose, engineering specialist, Test Control Systems/Equipment Design, Structural Test; Stanley Feinberg, group leader, Electrical/Electronic Equipment, EA-6B Program Design; Robert Weiss, group leader, Electro/Mechanical Design, E-2/C-2; Robert Alloca, principal engineer, Thermal Systems; Martin Bourbin, engineering specialist, Computational Methods for Vehicle Component Design & Analysis; Robert Martin, project leader, E-2C Support Software; Janet Schuman, group leader, EA-6B Support and Simulation Software; Michael Simonian, group leader-Dynamics, F-14 Program; Ray Mangan, group leader, Aerodynamics, F-14 Program; Dr. Warren Davis, technical specialist, Computational Methods and Configuration Design; Dr. William Mason, technical specialist, Advanced Tactical Aircraft Configuration Aerodynamics and Design; Eduard Schrama, project engineer, EA-6B ICAP/CTO; Anthony Pizzimenti, project engineer, EA-6B ADVCAP Systems Requirements/Software Design; Charles Osborne, project leader, Systems, A-6E Program; Robert Reilly, group leader, F-14D Flight Application and Design; Leslie Wittekind, project leader, Structural Test, Composite Wing and Vertical Tail Program; Herbert Charnes, deputy engineering manager, E-2; William Grube, deputy engineering manager, E-2; George Hummel, principal engineer, Embedded Software Architecture; Desmond Loughman, group head, Application Software; Richard Chiafolo, group head, Systems Control; George Castellano, manager, Commercial Products Engineering Services; Steven Rosenstein, engineering specialist, Software Systems Resource Management; John Janis, group leader, Software Development and Test; Jack Petralia, director of Engineering Test Operations; Sol Boles, principal engineer, Radar Systems Analysis and Design; Daniel Sullivan, group leader, Electrical/Electronics/Materials, Engineering Standards; Hobart Van Nostrand III, group leader, Mechanical/Fluids, Engineering Standards; Ron Henderson, technical specialist, Experimental Aerodynamics and Configuration Design; Stephen Greene, technical specialist, Simulation Modeling/Analysis; Harry J. Grossman, team leader, Major Studies, Simulation Equipment Design; Donald F. Waller, project manager, Flight Management Task Center; Joseph V. Licari, project manager, Development Center Programs; George Zeman, group head, Antenna and Radome Test; Theodore Agress, program engineering manager, Melbourne Engineering Annex; Donald Cunnius, group head, Mass Properties Analysis and Control; Peter Goldblatt, group leader, RM&S F/EF-111 A/E Program; Ralph Morelli, group leader, Systems Development & Integration, EA-6B Program; Stephen Post, principal engineer, Integrated Avionics Processing Architecture; Aare Kivi, engineering specialist, Jamming Transmitters; William Austin, engineering specialist, Systems Integration/Verification and Validation Test Requirements; Melvin Lynn, project leader, F-14D, Radar Avionics Design; Gerald J. Fox, principal engineer, Human Factors Engineering; Frederick Rademacher, project leader, Avionics Design, A-6F Program; James H. Jacquette, engineering specialist, Electromagnetic Environmental Effects; Anthony Zumpano, engineering specialist, Electronic Interconnection Technology; Douglas Grundy, principal engineer, Fuel Systems; Allan Dantowitz, technical specialist, Test Methods; Bruce Weber, group leader, Electromagnetic Environmental Effects; Dennis Buckland, engineering specialist, Custom VLSI Applications.

Integrated Logistics Support - Michael Hearney, technical specialist, Electronics Packaging, ILS Engineering; Michael G. Dolan, supervisor, ILS Commodities Control.

V. J. Maggio

W. R. Martens

R. T. McNiece

M. G. Merritt

C. R. Miller

G. W. Moles

C. R. Murray

R. G. Myer

Henry G. Faulhaber, Great River, Electronics Systems
Richard A. Fox, Great River, Electronics Systems
John J. Franciscovich, Bethpage, Aircraft Systems
Vincent M. Frazzitta, Bethpage, Aircraft Systems
William R. Gorman, Bethpage, Aircraft Systems
Michael P. Healy, Calverton, Aircraft Systems
Larry Helner, Melbourne, Melbourne Systems
Edward Hirsch, Great River, Electronics Systems
Stanley Hirsch, Melville, Melbourne Systems
Milton J. Hosek, Bethpage, Aircraft Systems
Felix P. Iasevoli, Calverton, Aircraft Systems
Frederick E. Jansky, Melville, Aerostructures
William J. Johnson, Bethpage, Aircraft Systems
Frederick A. Kaufman Jr., Bethpage, Aircraft Systems
William A. Knight, Bethpage, Aircraft Systems
Bernard Kram, Bethpage, Aircraft Systems
Henry L. Kreymborg, Calverton, Aircraft Systems
Arthur Lim, Bethpage, Aircraft Systems
Hermann K. Lohmann, Melville, Aircraft Systems
Vincent J. Maggio, Calverton, Aircraft Systems
Walter R. Martens, Calverton, Corporate Services
John F. Martinez, Bethpage, Aircraft Systems
Robert T. McNiece, Bethpage, Aircraft Systems
Miles G. Merritt, Bethpage, Aircraft Systems
Charles R. Miller, Melville, Aircraft Systems
George W. Moles, Bethpage, Aircraft Systems
Carl R. Murray, Bethpage, Corporate Services
Robert G. Myer, Melbourne, Melbourne Systems
Henry A. Mysiborski, Calverton, Aircraft Systems
Millard A. Northridge III, Calverton, Aircraft Systems
Vincent J. Pernice, Melville, Melbourne Systems
Berger O. Peterson, Melville, Aircraft Systems
Owen F. Pettit, Melville, Aircraft Systems
Peter D. Pisani, Bethpage, Aircraft Systems
Thomas E. Reilly, Melville, Aircraft Systems
William Richter, Milledgeville, Aircraft Systems
Ronald W. Sadler, Bethpage, Aircraft Systems
Rosario Sciglio, Melville, Aircraft Systems
Joseph V. Troiano, Great River, Electronics Systems
Rocco J. Vasti, Great River, Electronics Systems
David L. Walker, Bethpage, Aircraft Systems
Calvin H. Weiser, Bethpage, Aircraft Systems

M. A. Northridge

V. J. Pernice

B. O. Peterson

O. F. Pettit

P. D. Pisani

T. E. Reilly

W. Richter

R. W. Sadler

R. Sciglio

J. V. Troiano

C. H. Weiser

Obituaries

William G. Connors of Maintenance, Milledgeville, Aircraft Systems Division, died July 30 at the age of 59. He had been with the company since 1959 and resided at 144 Swint Ave., Milledgeville, Georgia.

Felix J. Cosentino of Subsystems Reliability, Bethpage, Aircraft Systems Division, died July 24 at the age of 64. He had been with the company since 1965 and resided at 38 Normandy Dr., Bethpage, N.Y.

Richard J. Greenhill of Inventory Management, Great River, Electronics Systems Division, died August 5 at the age of 53. He had been with the company since 1985 and resided at 136 Lillian Rd., Lake Ronkonkoma, N.Y.

George J. Lambert of Instruct/Analysis, Calverton, Aircraft Systems Division, died July 27 at the age of 59. He had been with the company since 1966 and resided at 20 East Third St., Deer Park, N.Y.

Personals

My family and I would like to express our appreciation and thanks to all my co-workers and ESO for their expressions of sympathy and support during the recent loss of our father. **Chiu Yung**

Many thanks to all my friends, co-workers and ESO for the beautiful flowers, condolences and support during the recent loss of my wife. **Fred Kokoska**

Going Back To School?

All Grummanites can participate in Grumman's Tuition Reimbursement program. The program reimburses you for your tuition outlay for college courses approved by Grumman, if you make the grade.

Good grades bring financial rewards. An A nets the recipient a 100 percent refund while B's earn 85 percent back and a C entitles the student to a 75 percent refund. Anything lower is not reimbursed.

This system requires an initial investment by the students. They lay out the money up front and then the company reimburses them when grades are in. You don't have to be pursuing a specific degree in order to be reimbursed.

Application forms are available in all Employee Services (ES) offices. For more information, contact Lorraine Alfino at (516) 575-3734.

The program is open to people from all Grumman divisions except Allied, Technical Services, and St. Augustine. These divisions operate their own programs. Grummanites in these divisions should contact their personnel administrator for more information.■

Retiree Obituaries

Frank C. Ambrosio of 931 Sequoia St., Barefoot Bay, Florida, died July 8, 1987. He retired in 1977.

Charles C. Bedell of 1810 Grand Ave., Baldwin, N.Y., died July 8, 1987. He retired in 1971.

Carl E. Boeckh of 19 Fremont St., Lindenhurst, N.Y., died July 8, 1987. He retired in 1977.

Jose J. D'Almeida of 35 Vee Jay Dr., Shoreham, N.Y., died July 21, 1987. He retired in 1971.

Charles C. Harrison of 400 Garner St., Thomaston, Georgia, died July 10, 1987. He retired in 1984.

William F. Jorch of 3255 Windmill Village, Punta Gorda, Florida, died July 23, 1987. He retired in 1978.

Charles J. Lewis of 122 Lake Shore Dr., No. Palm Beach, Florida, died July 27, 1987. He retired in 1970.

Louis G. Lombardi of 3113 S. R. 580, Lot 160, Safety Harbor, Florida, died July 24, 1987. He retired in 1966.

Lorenzo Martinez of Gloucester R21, Bayamon, Puerto Rico, died June 12, 1987. He retired in 1959.

Gustav J. Morgenstern of 425 Herricks Rd., New Hyde Park, N.Y., died July 4, 1987. He retired in 1982.

John Nicastro of 8511 Heather Blvd., Brooksville, Florida, died July 25, 1987. He retired in 1982.

John J. Petrowski Jr. of 15 Drury La., Great Neck, N.Y., died June 26, 1987. He retired in 1969.

Thomas C. Sands at P.O. Box 949, Center Moriches, N.Y., died June 12, 1987. He retired in 1977.

Kurt Schroer of 106 6th Ave., Huntington Station, N.Y., died July 31, 1987. He retired in 1976.

Charles H. Staffeldt of 234 Rose St., Copiague, N.Y., died July 27, 1987. He retired in 1971.

Patrick D. Towey of 82 Lucille St., Hempstead, N.Y., died August 1, 1987. He retired in 1974.

Wallace Willrick of 30 Stewart St., E. Islip, N.Y., died July 31, 1987. He retired in 1970.

William J. Zura of 29 Stewart St., Plainview, N.Y., died July 31, 1987. He retired in 1984.

Readership Survey

We don't want to do all the talking. We'd like to know what you think about the things you see in these pages. Your comments, suggestions and complaints are welcomed. Please take a few minutes and give us your opinions.

Article	Great	Good	Poor	Didn't Read
ADI Radar (Pg. 1)	☐	☐	☐	☐
Minong, Wis. (Pg. 2)	☐	☐	☐	☐
Rolls-Royce (Pg. 3)	☐	☐	☐	☐
O'Brien Speech (Pg. 4)	☐	☐	☐	☐
Lightning (Pg. 5)	☐	☐	☐	☐
Heat Treat (Pg. 6)	☐	☐	☐	☐
Security (Pg. 8)	☐	☐	☐	☐
Blood Donations (Pg. 9)	☐	☐	☐	☐
Milestones (Pg. 11)	☐	☐	☐	☐
Chairman's Letter	☐	☐	☐	☐

Suggestions For Future Articles:.....

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Comments About This Issue:.....

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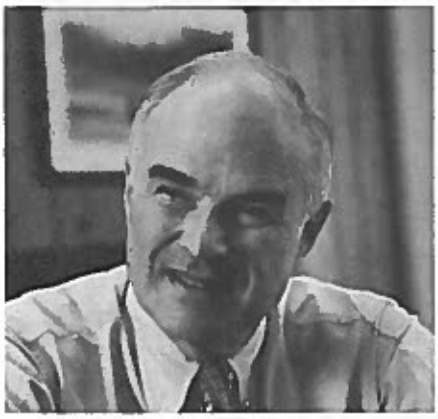
Name.....

(Required If You Wish A Reply) **Ext.**.....

Division.....

Mail to: Grumman World, A22-GHQ

A Letter From The Chairman



It was midnight in Islamabad when I got a call that we had won the Space Station Program Support contract. What wonderful news! There was another cornerstone under Grumman's future! The whole team had done a terrific job in putting Grumman's best foot forward. It was five in the morning before I could get back to sleep.

We won this contract over impressive competition. Moreover, it is the ultimate systems integration job — and Grumman is very, very good at putting all the pieces together and making them work. It affirms our position in space, continuing the legacy of the Orbiting Astronomical Observatory and the Lunar Module. I believe that when we look back years from now, this contract will seem every bit as important to us as the Lunar Module was.

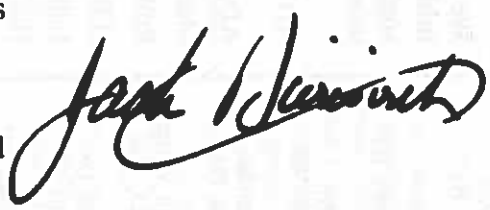
Everywhere I went in the Far East, I met people who had heard about Grumman's win. The space station program receives truly global recognition, recognition for the great scientific achievement it will represent and for the benefits its laboratories will bring to mankind.

I had hardly returned when the U.S. Air Force announced that Grumman was being awarded a contract to modernize F-8 fighters belonging to the People's Republic of China. This program is called Peace Pearl. Relations between the People's Republic of China and the United States are improving, and we can all be proud to play a part in this, too.

The X-29 program certainly set the stage for the Sabre II effort in China and Pakistan. And that, in turn, helped us establish our credentials for the Peace Pearl Program. Further, it's hard to say whether the award of the Space Station Program Support contract had anything to do with our winning the Peace Pearl, but it sure didn't hurt.

These new awards are part of a good set of contracts we've won this year, and they are all part of a winning streak that started in the end of 1984 with the contracts to upgrade the F-14 and the A-6. Research, planning, an awful lot of hard work — and a little good luck — have been a winning combination.

Grumman people own this company. They are building it, taking care of it, sacrificing for it — and they are being rewarded with one success story after another.



John C. Bierwirth
Grumman Corporation Chairman

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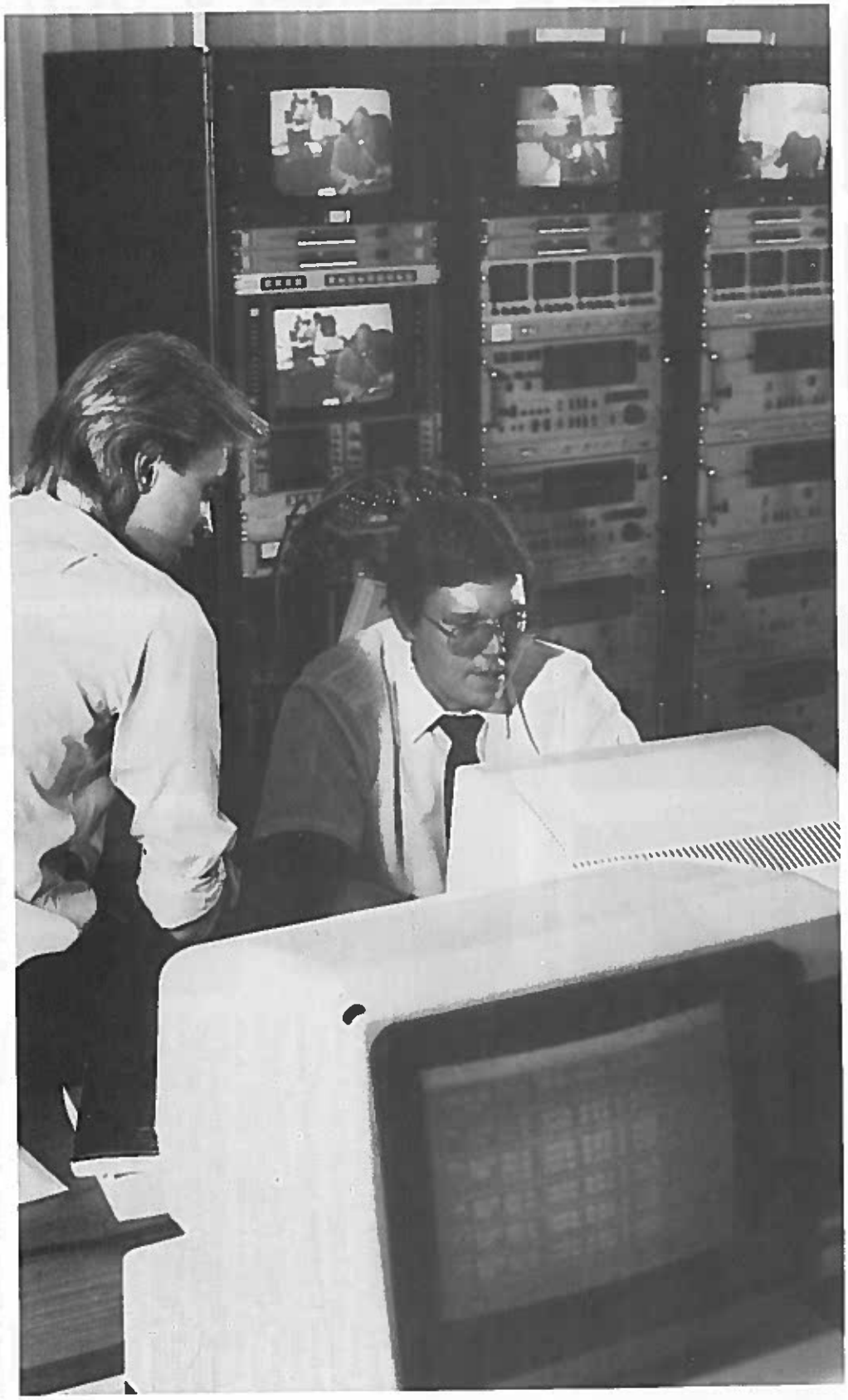

TV Guide

Mike Harof (L) and Rich Schmidt are running the Grumman-developed AIS 5000 through its paces. Most of the bugs have been worked out of the software. Grumman Electronics Systems Division is ready to take orders for the system, which can automate the programming of cable and UHF/VHF television stations.

Connected to a station's program scheduling system, the AIS positions videotapes according to schedule and switches to the tape machines at the right time. For the station's sales and billing systems, the AIS verifies that commercials were aired. The station can then decide to run ads again or credit clients for ads not run.

Cable stations, which receive programs by satellite, will use AIS only for inserting commercials. However, the system can run the entire schedule for UHF/VHF stations generating their programs locally.■